

METHOD FOR SEPARATING CELLS,  
ESPECIALLY PLATELETS, AND BAG ASSEMBLY THEREFOR

This application is a continuation of U.S. Patent Application No. 09/125,270, filed August 13, 1998, now U.S. Patent No. \* \_\_\_\_\_ \* which is a PCT national filing from PCT Application No. PCT/SE97/00257 claiming priority to Swedish Patent Application No. 9600713-3, filed February 26, 1996.

AREA OF INVENTION

The present invention relates to a method and a bag assembly intended to be used in connection with the separation of cells, and specifically for the production of platelets from pooled buffy coats and in other similar areas. The invention also relates to a bag assembly therefor, which is efficient and inexpensive.

PRIOR ART

An apparatus for plasmapheresis is disclosed in EP-B1-0304 431, and comprises a round bag and a centrifuge rotor specifically adapted for performing plasmapheresis.

A further improved bag system and centrifuge separator is disclosed in WO 95/01842 and comprises a ring-shaped outer bag and a central inner bag which is formed from the central part of the ring. The outer bag is adapted to form a shortened and conical ring. The inner bag is placed in a rigid center part which prevents the radial expansion of the inner bag, but allows it to expand axially when filled with liquid. The rigid center part and the shortened outer ring are placed in a centrifuge rotor.

A container assembly for washing blood cells is disclosed in US-A-5 114 396, comprising a round bag similar to the bag disclosed in EP-B1-0304 431. The container assembly comprises, in addition to a ring bag and an inner bag, further bags comprising further liquids used in the washing process. Such further bags are placed in a central rotor compartment on top of the inner bag, and

are not used during the centrifugation process. When the centrifugation rotor is stopped, the liquids in said further bags are used for specific purposes.

Normally, when separating platelets from a buffy coat, the separation takes place in a centrifuge in a G-field of suitable size and during a predetermined time duration. Then, the centrifuge is stopped and the bags are removed from the centrifuge and finally extracted in a secondary step through manual proceedings. Such removal and subsequent handling will inevitably cause some mixing and deterioration of the separation. It is necessary in various forms of the prior art to include a cell filter between the centrifuge bag and the storage bag, to inhibit other cells than platelets from being transferred to the storage bag.

#### DISCLOSURE OF THE INVENTION

The object of the present invention is to suggest a separation process suitable for separation of platelets and similar cells from a suspension and for transportation of the separated cells to a container while maintaining a high purity and at the same time avoid using a cell filter.

A method of separation and a bag assembly for use in such a method are more clearly defined in the appended claims.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Further features, advantages and embodiments of the invention will appear from the following detailed description of the invention with reference to the appended drawings in which:

Fig. 1 is a schematic top view of a bag assembly according to the invention.

Fig. 2 is a cross-sectional view of a centrifuge rotor together with the bag assembly of Fig. 1.

Fig. 3 is a cross-sectional view similar to Fig. 2 of an alternative embodiment of the invention.

Fig. 4 is a top view of an insert provided with a bag assembly of Fig. 1.

Fig. 5 is a top view of an alternative bag assembly according to the invention.

Fig. 6 is a schematic view of an insert provided with the bag assembly according to Fig. 5.

Fig. 7 is a cross-sectional view of a centrifuge rotor provided with the insert according to Fig. 6 and a bag assembly according to Fig. 5.

Fig. 8 is a schematic top view of still another bag assembly according to the invention.

Fig. 9 is a cross-sectional view of a centrifuge rotor provided with the bag assembly according to Fig. 8.

Fig. 10A is a partial cross-sectional view taken according to line 10-10 in Fig. 9, showing the chamber of the cell trap in an empty condition.

Fig. 10B is also a partial cross-sectional view taken according to line 10-10 in Fig. 9, but showing the chamber of the cell trap in a filled condition occupying the entire recess.

#### DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Fig. 1 shows a bag assembly intended for production of platelets from a pooled buffy coat. The bag assembly comprises an essentially annular processing bag 1, having an inlet tube 2 and an outlet tube 3 terminated by a platelet storage bag 4. The outlet tube is connected to an outlet 3a disposed at the radially inner portion of the processing bag. The annular processing bag 1 is in principle similar to the round bag disclosed in the above-mentioned EP-B1-0304 431, however,